SYNERGISTIC QUINCLORAC HERBICIDAL COMPOSITIONS

Field of the Invention

5

10

15

20

30

The present invention relates to a selective synergistic postemergent herbicidal composition for the control of undesired vegetation when applied to the locus of the vegetation. Quinclorac, 3,7-dichloro-8-quinolinecarboxylic acid (CAS 84087-01-4), certain protoporphyrinogen oxidase inhibitors, herein referred to as "protox inhibitors," and a number of herbicidal auxinic agents have been used individually for selective control of noxious weeds and plants without significant damage to desirable grasses and the like. Heretofore, it had not been recognized that when quinclorac is combined with a protox inhibitor or a protox inhibitor plus herbicidal auxinic compound in certain relative proportions, the combination exhibits an unexpected synergistic herbicidal effect providing more effective control of difficult to eradicate grassy weeds and undesirable broadleaf vegetation than the individual herbicidal materials used alone at comparable application rates.

Protox inhibitors that exhibit herbicidal synergistic effects in combination with quinclorac include carfentrazone-ethyl (CAS 128639-02-1), sulfentrazone (CAS 122836-35-5), and pyraflufen-ethyl, 2-chloro-5-(4-chloro-5-difluoromethoxy-1-methylpyrazol-3-yl)-4-fluorophenoxyacetic acid ester (CAS 129630-17-7). Protox inhibitors has been found to synergize the herbicidal effectiveness of a number of herbicidal auxinic agents including herbicidally active phenoxy, benzoic, pyridine, quinolinecarboxylic acid compounds, other than quinclorac, and amine and inorganic salts thereof.

25 Background of the Invention

Herbicidal auxenic compounds have been used for many years to control broadleaf noxious weeds without damage to desirable grasses infested with the weeds. 2,4-D, 2,4-DP, 2,4-DB, MCPP, MCPA, MCPB, which are exemplary herbicidal auxinic compounds, have all been registered and long used individually or in combination as herbicides for treating turf to control undesirable broadleaf vegetation without significantly adversely affecting desirable grasses. Similarly, herbicidal protox

inhibitors such as carfentrazone-ethyl, sulfentrazone, and pyraflufen-ethyl have in recent years been used to control undesirable broadleaf vegetation. Although auxinic and protox inhibitor compounds as described have individually been found to be effective in broadleaf weed control without significant damage to desirable grasses, these compounds have not been known to be effective for control of grassy weeds, such as crabgrass, goosegrass and dahlisgrass.

5

10

15

20

25

30

Thus, there continues to be a need for increasing the herbicidal effectiveness of exemplary herbicidal protox inhibitors and herbicidal auxinic compounds, which have heretofore been used alone or in combination, and especially to provide a herbicidal composition that will not only control noxious broadleaf vegetation, but also be effective against grassy weeds without adversely effecting desirable grasses. The urgency of the need is exacerbated by increasing governmental oversight of the sale and approved use rate of herbicidal materials. The recommended level of herbicide that may be applied per unit of area is under pressure from governmental, as well as for economic and environmental reasons.

In addition, certain species of undesirable broadleaf vegetation and grassy weeds are becoming more and more resistant to a number of the most widely used herbicides. Thus, on one hand ever more stringent conditions are being placed on the type and use rate of herbicides, while on the other hand accepted herbicides are becoming less and less effective over time in certain species of noxious weeds.

Furthermore, it is very expensive and time consuming to seek and obtain registration of a new herbicidal compound, including its proposed use rate. Approval data required must not only include evidence of efficacy at the application rates proposed but also the safety of the herbicide when applied at the recommended level. Accordingly, demonstration of synergism by the combination of existing herbicidal agents, permits use of the individual components of the synergistic combination at lower rates than when used alone, and in many instances ameliorates increasing resistance to herbicidal effectiveness.

Accordingly, there is a great need for improved broadleaf and grassy weed control compositions and a method of controlling such noxious vegetation without

adversely affecting desirable plants and which reduces the amount of chemical herbicidal agent necessary to obtain the acceptable weed control.

Brief Summary of the Invention

5

10

15

20

25

30

This invention relates to the discovery that when quinclorac, a herbicidal protox inhibitor and a herbicidal auxinic agent are combined, the resulting combination exhibits synergistic herbicidal effects, which are equal to or better than the herbicidal efficacy of the individual herbicides, even though each of the constituents is present at a lower concentration than the required amount of each herbicide applied alone.

In particular, tests have shown that when quinclorac, a herbicidal protox inhibitor and an auxinic herbicide agent are combined, and the resulting composition is applied at a recommended application rate for control of undesired broadleaf vegetation and grassy weeds, a demonstrable synergistic effect is obtained. It has unexpectedly been found that when a protox inhibitor is combined with quinclorac, the combination containing a lesser amount of quinclorac than recommended as a single herbicidal agent, not only exhibits more effective control of broadleaf weeds, but in addition this combination provides better control of grassy weeds than when quinclorac is applied alone, all without significant damage to desirable turf and grasses. This synergistic effect in controlling broadleaf noxious vegetation as well as grassy weeds is enhanced even more by the addition of an auxinic compound.

The selective synergistic postemergent herbicidal composition for the control of undesired vegetation when applied at a recommended application rate to the locus of undesired vegetation includes from about 0.1 to about 1 lb/acre of quinclorac and from about 0.005 to about 0.06 lb/acre of a selective protox herbicidal inhibitor. Better results are obtained when the amount of quinclorac is supplied at a rate of about 0.18 to about 0.75 lb/acre and a sufficient amount of the protox inhibitor is provided at a rate of about 0.01 to about 0.05 lb/acre. Best results are obtained when a sufficient amount of quinclorac is provided to supply about 0.375 lb/acre of quinclorac. Similarly, better results are obtained when the amount of the protox inhibitor is sufficient to supply from about 0.01 to about 0.05 lb/acre, and best results are obtained

when the protox inhibitor provided is sufficient to supply from about 0.02 to about 0.03 lb/acre.

Synergistic results are preferably obtained by providing a sufficient amount of the active herbicidal ingredients to supply from about 0.1 to about 1 lb/acre of quinclorac, from about 0.005 to about 0.06 lb/acre of the protox inhibitor and from about 0.15 to about 2 lbs/acre of the auxinic compound.

Improved synergism is obtained between the quinclorac, the protox inhibitor and the auxinic herbicide agent when a sufficient amount of the active ingredients is provided to supply from about 0.18 to about 0.75 lb/acre of quinclorac, from about 0.01 to about 0.05 lb/acre of the protox inhibitor, and from about 0.25 to about 1.5 lbs/acre of the auxinic herbicide. Best synergistic results obtain by combining sufficient quinclorac, protox inhibitor and auxinic herbicide when the composition contains an amount of the active ingredients to provide about 0.375 lb/acre of the quinclorac, from about 0.02 to about 0.03 lb/acre of the protox inhibitor, and about 0.75 lb/acre of the auxinic herbicide.

Exemplary protox inhibitors useful in the present invention include carfentrazone-ethyl, sulfentrazone, pyraflufen-ethyl, flumiclorac-pentyl, flumioxazin, fluthiacet-methyl, aclonifen, bifenox, chlornitrophen, ethoxyfen, fluoroglycofen-ethyl, fomesafen, lactofen, oxyfluorfen, azafendin, cinidon-ethyl, oxadiargyl, oxadiazon, pentoxazone, flumipropyn, flupropacil, benzfendizone, nipyraclofen, fluazolate, thidiazimin or a compound having the structural formula

or combinations thereof.

5

10

15

20

25

30

The auxinic herbicidal agent may comprise one or more compounds selected from the group consisting of herbicidally active phenoxy, benzoic, pyridine, quinolinecarboxylic acid compounds, other than quinclorac, and amine, esters and

inorganic salts thereof. The salts are preferably selected from a group consisting of, but are not limited to, methylamine, ethylamine, isopropylamine, monomethanolamine, monoethanolamine, monoisopropanolamine, dimethylamine, diethylamine, diisopropylamine, dimethanolamine, diethanolamine, diisopropanolamine, trimethylamine, triethylamine, tri-isopropylamine, trimethanolamine, triethanolamine, triisopropanolamine, and ammonium, sodium, potassium, lithium, calcium salts of the above acids are also useful. The auxinic herbicidal acidic compounds may be selected from a group consisting of 2,4-dichlorophenoxyacetic acid (2,4-D), 2,4dichlorophenoxypropionic acid (2,4-DP), 2,4-dichlorophenoxybutyric acid(2,4-DB), 2methyl-4-chlorophenoxyacetic acid (MCPA), 2-methyl-4-chlorophenoxypropionic acid (MCPP), 2-methyl-4-chlorophenoxybutyric acid, 2,4,5-trichlorophenoxyacetic acid, 2,3,6-trichlorobenzoic acid, 3,6-dichloro-2-methoxybenzoic acid (dicamba), 2-methoxy-3,5,6-trichlorobenzoic acid, 4-chloro-2-oxobenzothiazolin-3-ylacetic acid, 4-amino-3,5,6-trichloropicolinic acid, trichloroacetic acid, 2,2-dichloropropionic acid, 3-amino-2,5-dichlorobenzoic acid, methane arsonic acid, 2,3,6-trichlorophenylacetic acid, 3,6endoxohexahydrophthalic acid, 3,5,6-trichloro-4-aminopicolinic acid, 7-chloro-3methyl-8-quinolinecarboxylic acid, ((4-amino-3,5-dichloro-6-fluoro-2pyridinyl)oxy)acetic acid, 3,4,6-trichloro-2-pyridinyloxyacetic acid, 3,6-dichloro-2pyridinecarboxylic acid, and 1-methylheptyl ester. Ester forms of the auxinic herbicidal agents include carbon chain lengths, either linear or branched, in which from C₁ to C₂₀ are present.

Detailed Description of the Invention

The synergistic composition of this invention resulting from the combination of quinclorac, a herbicidal protox inhibitor and an auxinic herbicide as active agents normally would include any one of a number of well known inert ingredients, depending upon the nature of the product commercialized. Preferred synergistic formulations are as follows.

25

5

10

15

Example 1

	Active Ingredi	ient	Percent of Active Ingredient in Formulation
	Quinclorac		4.3%
	Sulfentrazone		0.3%
5	2,4D		8.6%
			Example 2
	Active Ingredi	ient	Percent of Active Ingredient in Formulation
	Quinclorac		4.3%
10	Carfentrazone	-ethyl	0.2%
	MCPA	12%	
			Example 3
	Active Ingredi	ent	Percent of Active Ingredient in Formulation
15	Quinclorac		4.3%
	Sulfentrazone		0.3%
	MCPA	12%	

The quinclorac content of the formulation is from about 1.0% to about 11.5 %, more particularly from about 1.8% to about 4%, and preferably 4.3%. The carfentrazone-ethyl, sulfentrazone or pyraflufen-ethyl is from about 0.005% to about 0.06%, more particularly from about 0.01% to about 0.05%, and preferably from about 0.02% to about 0.03%. The auxinic herbicide is present in the formulation from about 1.7% to about 22.2%, more particularly from about 2.8% to about 16.3%, and preferably about 8.6%.

Greenhouse Tests

Pots of crabgrass, dandelion, white clover, and plantain grown in greenhouse soiless growth media were sprayed with a greenhouse pot sprayer at 43.46 gallons of spray solution/acre and allowed to stand in the greenhouse. Visual observation of the effects made by the herbicidal compositions on the plants in the test pots was recorded for control of crabgrass, dandelion, clover and plantain at 24 hours after treatment (HAT), 48 hours after treatment (HAT), 72 hours after treatment (HAT), 7 days after

treatment (DAT), 14 days after treatment (DAT) and 21 days after treatment (DAT). A control rating scale of 1 to 9 was used to record the visual observation of the effect of the herbicidal composition on the plants over the time period of the tests. 1 = no control, and 9 = death of plant, with intervening numbers representing successive degrees of observed effectiveness of the herbicidal composition over time. The 1 - 9 control rating scale was converted to percent control in the test data charts that follow.

The test protocol of S.R. Colby as set out in his article entitled "Calculating Synergistic and Antagonistic Responses of Herbicide Compositions," received for publication April 11, 1966, Contribution No. 3796 and Scientific Article No. 1271 of the Maryland Agricultural Experiment Station, Department pf Agronomy, University of Maryland was followed to evaluate the synergistic properties of the combination of quinclorac plus a herbicidal protox inhibitor, and a combination of quinclorac, plus a herbicidal protox inhibitor plus a herbicidal auxinic agent as compared with the individual herbicides, using Colby's formulas E = X + Y - XY/100 for a two herbicide combination, where E = the expected percent of inhibition of growth by herbicides, X = the percent inhibition of growth by herbicide A at p lb/A, and Y = the percent inhibition of growth by herbicide B at q lb/A, for a given combination of two herbicides. Colby's formula E = X + Y + Z - (XY + XZ + YZ)/100 + XYZ/10,000, was used for the three-way herbicide combination evaluation, where E = X and Y are the same as in the two herbicide formula and E = The percent inhibition of growth by the third herbicide.

It is recognized in the herbicide field that control of grassy weeds such as crabgrass can be obtained only over a time period of 10 to 14 days, whereas with the present synergistic combination, crabgrass control is obtained in as little as seven days as demonstrated by the test data set forth below.

• • •

Test 1 C	Test 1 Control (1-9) 24 HA	24 HA	% C	% Control 24 HAT	AT	Treatment						
Crabgrass	Crabgrass Dandelion Clover) Clover	Crabgrass	Crabgrass Dandelion Clover	Clover							
2	-	-	22.2	11.1	11.1	Quinclorac @ 0.75 lbs/A						
2	_	_	22.2	1	11.1	Quinclorac @ 0.375 lbs/A						
2	2	-	22.2	22.2	11.1	Quinclorac @ 0.18 lbs/A						
m	3	'n	33.3	33.3	33.3	Carfentrazone @ 0.02 lbs/A						
2	4	٣	22.2	44.4	33.3	Carfentrazone @ 0.01 lbs/A						
2	æ	-	22.2	33.3	Ξ	2,4-D IOE @ 0.70 lbs/A	Crab	Crabgrass	Dandelion	elion	Clover	ver
							Expected	Actual	Expected	Actual	Expected	Actual
4	4	4	44.4	44.4	44.4	0.75 Quinclorac + 0.02 Carfentrazone	48.1	44.4	40.7	44.4	40.7	44.4
4	4	4	44.4	4.44	44.4	0.75 Quinclorac + 0.01 Carfentrazone	39.5	44.4	50.6	44.4	40.7	44.4
3	4	3	33.3	44.4	33.3	0.375 Quinclorac + 0.02 Carfentrazone	48.1	33.3	40.7	44.4	40.7	33.3
3	3	3	33.3	33.3	33.3	0.375 Quinclorac + 0.01 Carfentrazone	39.5	33.3	50.6	33.3	40.7	33.3
3	S	4	44.4	55.6	44.4	0.18 Quinclorac + 0.02 Carfentrazone	48.1	33.3	48.1	55.6	40.7	44.4
4	4	4	44.4	44.4	44.4	0.18 Quinclorac + 0.01 Carfentrazone	39.5	44.4	56.8	44.4	40.7	44.4
s	S	4	44.4	55.6	4.4	0.75 Quinclorac + 0.02 Carfentrazone + 0.70 2,4-D IOE	59.7	55.6	60.5	55.6	47.3	44.4
S	S	4	55.6	55.6	44.4	0.75 Quinclorac + 0.01 Carfentrazone + 0.70 2,4-D IOE	52.9	55.6	67.1	55.6	47.3	44.4
5	S	4	44.4	55.6	44.4	0.375 Quinclorac + 0.02 Carfentrazone + 0.70 2,4-D IOE	59.7	55.6	60.5	55.6	47.3	44.4
4	4	4	44.4	44.4	44.4	0.375 Quinclorac + 0.01 Carfentrazone + 0.70 2,4-D IOE	52.9	44.4	67.1	44.4	47.3	44.4

Test 1 Con	Test 1 Control (1-9) 48 H	H	% Con	% Control 48 HAT		Treatment						
Crabgrass	Dandelion	Clover	Crabgrass Dandelion Clover	indelion Clov	'er							
4	3	3	44.4	33.3	33.3	Quinclorac @ 0.75 lbs/A						
4	æ	3	44.4	33.3	33.3	Quinclorac @ 0.375 lbs/A						
	3	2	33.3	33.3	22.2	Quinclorac @ 0.18 lbs/A			*	*		
2	5	S	55.6	55.6	55.6	Carfentrazone @ 0.02 lbs/A						
3	\$	5	33.3	55.6	55.6	Carfentrazone @ 0.01 lbs/A						
4	4	4	44.4	44.4	44.4	2,4-D IOE @ 0.70 lbs/A	Crabgrass	ass.	Dandelion	elion	Clover	ver
							Expected	Actual	Expected	Actual	Expected Actual	Actual
5	9	9	55.6	2.99	2.99	0.75 Quinclorac + 0.02 Carfentrazone	75.3	55.6	70.4	66.7	70.4	1.99
9	7	7	66.7	77.8	77.8	0.75 Quinclorac + 0.01 Carfentrazone	63.0	66.7	70.4	77.8	70.4	77.8
2	7	7	55.6	77.8	77.8	0.375 Quinclorac + 0.02 Carfentrazone	75.3	55.6	70.4	77.8	70.4	77.8
7	7	7	77.8	77.8	77.8	0.375 Quinclorac + 0.01 Carfentrazone	63.0	77.8	70.4	77.8	70.4	77.8
7	∞	7	77.8	88.9	77.8	0.18 Quinclorac + 0.02 Carfentrazone	70.4	77.8	70.4	6.88	65.4	77.8
7	7	7	77.8	77.8	77.8	0.18 Quinclorac + 0.01 Carfentrazone	55.6	77.8	70.4	77.8	65.4	77.8
∞	∞	7	88.9	6.88	77.8	0.75 Quinclorac + 0.02 Carfentrazone + 0.70 2,4-D IOE	86.3	88.9	83.5	88.9	83.5	77.8
∞	∞	œ	88.9	6.88	88.9	0.75 Quinclorac + 0.01 Carfentrazone + 0.70 2,4-D IOE	79.4	88.9	83.5	88.9	83.5	88.9
7	7	7	77.8	77.8	77.8	0.375 Quinclorac + 0.02 Carfentrazone + 0.70 2,4-D IOE	86.3	77.8	83.5	77.8	83.5	77.8
7	9	7	77.8	2.99	77.8	0.375 Quinclorac + 0.01 Carfentrazone + 0.70 2,4-D IOE	79.4	77.8	83.5	2.99	83.5	77.8

Test 1 Co	Test 1 Control (1-9) 7 DAT) 7 DAT	%	% Control 7 DAT	DAT	Treatment						
Crabgrass 1	Dandelion	Crabgrass Dandelion Clover Plantain Crabgrass Dandelion Clover	Crabgrass Da	indelion C	lover Plantain							
4	3	3	44.4	33.3	33.3	Quinclorac @ 0.75 lbs/A						-
4	3	3	4.4	33.3	33.3	Quinclorac @ 0.375 lbs/A						
4	3	3	44.4	33.3	33.3	Quinclorac @ 0.18 lbs/A						
7	∞	9	77.8	88.9	2.99	Carfentrazone @ 0.02 lbs/A						
7	∞	9	77.8	88.9	2.99	Carfentrazone @ 0.01 lbs/A						
4	9	4	44.4	2.99	44.4	2,4-D IOE @ 0.70 lbs/A	Crabgrass	rass	Dandelion	elion	Clover	er
							Expected Actual		Expected	Actual	Expected	Actual
	∞	8	88.9	88.9	6.88	0.75 Quinclorac + 0.02 Carfentrazone	87.7	88.9	92.6	88.9	77.8	88.9
	8	∞	88.9	6.88	6.88	0.75 Quinclorac + 0.01 Carfentrazone	87.7	88.9	97.6	88.9	77.8	88.9
∞	∞	∞	88.9	88.9	88.9	0.375 Quinclorac + 0.02 Carfentrazone	87.7	88.9	92.6	88.9	77.8	88.9
∞	∞	&	88.9	88.9	88.9	0.375 Quinclorac + 0.01 Carfentrazone	87.7	88.9	92.6	88.9	77.8	88.9
∞	6	8	88.9	100.0	88.9	0.18 Quinclorac + 0.02 Carfentrazone	87.7	88.9	92.6	100.0	77.8	88.9
∞	6	8	88.9	100.0	6.88	0.18 Quinclorac + 0.01 Carfentrazone	87.7	88.9	92.6	100.0	77.8	88.9
∞	6	∞	88.9	100.0	88.9	0.75 Quinclorac + 0.02 Carfentrazone + 0.70 2,4-D IOE	93.1	88.9	97.5	100.0	87.7	88.9
∞	6	8	88.9	100.0	6.88	0.75 Quinclorac + 0.01 Carfentrazone + 0.70 2,4-D IOE	93.1	88.9	97.5	100.0	87.7	88.9
∞	6	8	88.9	100.0	6.88	0.375 Quinclorac + 0.02 Carfentrazone + 0.70 2,4-D IOE	93.1	88.9	97.5	100.0	87.7	88.9
8	6	8	88.9	100.0	88.9	0.375 Quinclorac + 0.01 Carfentrazone + 0.70 2,4-D IOE	93.1	88.9	97.5	100.0	87.7	88.9

Test 1	Test 1 Control (1-9) 14 DAT	9) 14 DAT	r		% Control 14	4 DAT	Ţ	Treatment						
Crabgras	Crabgrass Dandelion		Plantain	Clover Plantain Crabgrass Dandelion	•	Clover Plantain	antain							
2	9	∞		55.6	2.99	88.9	Ŏ	Quinclorac @ 0.75 lbs/A						
- S	7	6		55.6	77.8	100.0	Ŏ	Quinclorac @ 0.375 lbs/A						
7	œ	6		77.8	88.9	100.0	Ó	Quinclorac @ 0.18 lbs/A						
3	6	6		33.3	100.0	100.0	Ü	Carfentrazone @ 0.02 lbs/A						
3	∞	7		33.3	88.9	77.8	Ü	Carfentrazone @ 0.01 lbs/A						
е	6	∞		33.3	100.0	88.9	2,	2,4-D IOE @ 0.70 lbs/A	Crabgrass	rass	Dandelion	ion	Clover	ř.
									Expected Actual		Expected Actual		Expected	Actual
∞	6	6		88.9	100.0	100.0	0.	0.75 Quinclorac + 0.02 Carfentrazone	70.4	88.4	100.0	100.0	100.0	100.0
<u></u>	6	6		88.9	100.0	100.0	0.	0.75 Quinclorac + 0.01 Carfentrazone	70.4	88.9	96.3	100.0	97.5	100.0
7	6	6		77.8	100.0	100.0	0.	0.375 Quinclorac + 0.02 Carfentrazone	70.4	77.8	100.0	100.0	100.0	100.0
9	6	6		66.7	100.0	100.0	0	0.375 Quinclorac + 0.01 Carfentrazone	70.4	66.7	97.5	100.0	100.0	100.0
9	6	∞		2.99	.100.0	6.88	0	0.18 Quinclorac + 0.02 Carfentrazone	85.2	66.7	100.0	100.0	100.0	88.9
7	6	∞		77.8	100.0	88.9	0.	0.18 Quinclorac + 0.01 Carfentrazone	85.2	77.8	8.86	100.0	100.0	88.9
7	6	6		77.8	100.0	100.0	0.	0.75 Quinclorac + 0.02 Carfentrazone + 0.70 2,4-D IOE	80.2	77.8	100.0	100.0	100.0	100.0
∞	6	6		88.9	100.0	100.0	0	0.75 Quinclorac + 0.01 Carfentrazone + 0.70 2,4-D IOE	80.2	88.9	100.0	100.0	99.7	100.0
∞	6	6		88.4	100.0	0.001	0	0.375 Quinclorac + 0.02 Carfentrazone + 0.70 2,4-D IOE	80.2	88.4	100.0	100.0	100.0	100.0
8	6	6		88.9	100.0	100.0	0	0.375 Quinclorac + 0.01 Carfentrazone + 0.70 2,4-D IOE	80.2	88.9	0.001	100.0	100.0	100.0

ı		. 1
٦		ч
	_	_

								·						
Test 2	Test 2 Control (1-9) 24 HAT	24 HAT		!	% Control 24 HAT	4 HAT		Treatment						
-	: -	Clover	ā		:									
Crangrass 2	Crabgrass Dandellon	2	riantain	riantain Craograss	Danuellon 22.2	22.2	Flamian	Ouinclorac @ 0.75 lbs/A						
2	2	2		22.2				Quinclorac @ 0.375 lbs/A						
3	2	2		33.3				Quinclorac @ 0.18 lbs/A						
4	2	2		44.4	22.2	22.2		Sulfentrazone @ 0.03 lbs/A						
3	2	2		33.3	22.2	22.2		Sulfentrazone @ 0.02 lbs/A						
3	3	3		33.3	33.3	33.3		2,4-D IOE @ 0.70 lbs/A	Crabgrass	rass	Dandelion	elion	Clover	/er
									Expected Actual		Expected Actual	Actual	Expected Actual	Actual
4	3	3		44.4	33.3	33.3		0.75 Quinclorac + 0.03 Sulfentrazone	56.8	44.4	39.5	33.3	39.5	33.3
5	3	5		55.6	33.3	55.6		0.75 Quinclorac + 0.02 Sulfentrazone	48.1	55.6	39.5	33.3	39.5	55.6
5	3	5		55.6	33.3	55.6		0.375 Quinclorac + 0.03 Sulfentrazone	56.8	55.6	39.5	33.3	39.5	55.6
5	3	5		55.6	33.3	55.6		0.375 Quinclorac + 0.02 Sulfentrazone	48.1	55.6	39.5	33.3	39.5	55.6
4	4	4		44.4	44.4	44.4		0.18 Quinclorac + 0.03 Sulfentrazone	63.0	44.4	39.5	44.4	39.5	44.4
5	4	3		55.6	44.4	33.3		0.18 Quinclorac + 0.02 Sulfentrazone	55.6	55.6	39.5	44.4	39.5	33.3
9	5	9		66.7	55.6	66.7		0.75 Quinclorac + 0.03Sulfentrazone + 0.70 2,4-D IOE	71.2	66.7	59.7	55.6	59.7	66.7
9	5	9		66.7	55.6	66.7		0.75 Quinclorac + 0.02 Sulfentrazone + 0.70 2,4-D IOE	65.4	66.7	59.7	55.6	59.7	66.7
9	5	9		66.7	55.6	66.7		0.375 Quinclorac + 0.03 Sulfentrazone + 0.70 2,4-D IOE	71.2	66.7	59.7	55.6	59.7	66.7
9	5	9		66.7	55.6	66.7		0.375 Quinclorac + 0.02 Sulfentrazone + 0.70 2,4-D IOE	65.4	66.7	59.7	55.6	265	66.7

~	7	
_	_	

Test 2	Test 2 Control (1-9) 72 HAT	72 HAT	6	% Control 72 HAT	HAT		Treatment						
Crabgrass	Crabgrass Dandelion	Clover Plantain Crabgrass		Dandelion	Clover	Plantain							
4	3	3	44.4	33.3	33.3		Quinclorac @ 0.75 lbs/A						
3	3	3	33.3	33.3	33.3		Quinclorac @ 0.375 lbs/A						
4	5	3	44.4	55.6	33.3		Quinclorac @ 0.18 lbs/A						
3	4	2	33.3	44.4	22.2		Sulfentrazone @ 0.03 lbs/A						
3	4	3	33.3	44.4	33.3		Sulfentrazone @ 0.02 lbs/A						
9	9	9	66.7	66.7	2.99		2,4-D IOE @ 0.70 lbs/A	Crabgrass	grass	Dandel	del	Clover	/er
								Expected Actual		Expected Actual	Actual	Expected Actual	Actual
7	8	7	77.8	6.88	77.8		0.75 Quinclorac + 0.03 Sulfentrazone	63.0	77.8	63.0	88.9	48.1	77.8
7	8	9	77.8	88.9	1.99		0.75 Quinclorac + 0.02 Sulfentrazone	63.0	77.8	63.0	88.9	55.6	66.7
5	8	4	55.6	88.9	44.4		0.375 Quinclorac + 0.03 Sulfentrazone	55.6	55.6	63.0	88.9	48.1	44.4
9	8	5	1.99	88.9	55.6		0.375 Quinclorac + 0.02 Sulfentrazone	55.6	66.7	63.0	88.9	55.6	55.6
9	8	4	66.7	88.9	44.4		0.18 Quinclorac + 0.03 Sulfentrazone	63.0	66.7	75.3	88.9	48.1	44.4
9	∞	4	1.99	88.9	44.4		0.18 Quinclorac + 0.02 Sulfentrazone	63.0	66.7	75.3	88.9	55.6	44.4
8	8	8	88.9	88.9	88.9		0.75 Quinclorac + 0.03Sulfentrazone + 0.70 2,4-D IOE	87.7	88.9	87.7	88.9	82.7	88.9
8	8	8	88.9	88.9	88.9		0.75 Quinclorac + 0.02 Sulfentrazone + 0.70 2,4-D IOE	87.7	88.9	87.7	88.9	85.2	88.9
8	8	8	88.9	88.9	88.9		0.375 Quinclorac + 0.03 Sulfentrazone + 0.70 2,4-D IOE	85.2	88.9	87.7	88.9	82.7	88.9
8	8	8	88.9	88.9	88.9		0.375 Quinclorac + 0.02 Sulfentrazone + 0.70 2,4-D IOE	85.2	88.9	87.7	88.9	85.2	88.9

ς	٠	İ	•	
	_	•	,	
	_	7	4	

.

•

Test 2	Test 2 Control (1-9) 7 DAT	9) 7 DA	T		% Control 7 DAT	DAT	_	Treatment						П
Crabgrass	Crabgrass Dandelion	Clover	Plantain	Plantain Crabgrass	Dandelion Clover P	Clover P	lantain							
7	3	7		77.8	33.3	77.8	5	Quinclorac @ 0.75 lbs/A						
7	3	7		77.8	33.3	77.8	3	Quinclorac @ 0.375 lbs/A						
3	8	9		33.3	88.9	2.99	<u> </u>	Quinclorac @ 0.18 lbs/A						
2	8	5		22.2	88.9	55.6	S	Sulfentrazone @ 0.03 lbs/A						
2	8	7		22.2	88.9	77.8	S	Sulfentrazone @ 0.02 lbs/A		•				
2	8	9		22.2	88.9	66.7	2	2,4-D IOE @ 0.70 lbs/A	Crabgrass	rass	Dandelion	lion	Clover	
									Expected Actual	Actual	Expected Actual	Actual	Expected	Actual
&	∞	∞		88.9	88.0	6.88	0	0.75 Quinclorac + 0.03 Sulfentrazone	82.7	88.9	92.6	88.9	90.1	88.9
7	∞	9		77.8	88.9	1.99	0	0.75 Quinclorac + 0.02 Sulfentrazone	82.7	77.8	92.6	88.9	95.1	66.7
∞	∞	∞		88.9	6.88	88.9	0	0.375 Quinclorac + 0.03 Sulfentrazone	82.7	88.9	92.6	88.9	90.1	88.9
9	∞	7		1.99	88.9	8.77	0	0.375 Quinclorac + 0.02 Sulfentrazone	82.7	66.7	92.6	88.9	95.1	77.8
9	∞	7		1.99	6.88	8.77	0	0.18 Quinclorac + 0.03 Sulfentrazone	48.1	66.7	8.86	88.9	85.2	77.8
9	∞	7		66.7	6.88	77.8	0	0.18 Quinclorac + 0.02 Sulfentrazone	48.1	66.7	8.86	88.9	97.6	77.8
8	6	*		88.9	100.0	88.9	0	0.75 Quinclorac + 0.03Sulfentrazone + 0.70 2,4-D IOE	86.6	88.9	99.2	100.0	6.7	88.9
∞	6	∞		88.9	100.0	6.88	0	0.75 Quinclorac + 0.02 Sulfentrazone + 0.70 2,4-D IOE	86.6	88.9	99.2	100.0	98.4	88.9
∞	6	∞		88.9	100.0	88.9	ی	0.375 Quinclorac + 0.03 Sulfentrazone + 0.70 2,4-D IOE	86.6	88.9	99.2	100.0	96.7	88.9
8	6	8		88.9	100.0	88.9	0	0.375 Quinclorac + 0.02 Sulfentrazone + 0.70 2,4-D IOE	86.6	88.9	99.2	100.0	98.4	88.9

Test 2	Test 2 Control (1-9) 14 DAT	9) 14 DA	T	_	% Control 14 DAT	4 DAT	Treatment						
Crabgrass Dandelion	Dandelion	Clover	Plantain	Crabgrass	Dandelion	Clover Plantain Crabgrass Dandelion Clover Plantain							
∞	9	6		6.88	66.7	100.0	Quinclorac @ 0.75 lbs/A						
7	80	6		77.8	88.9	0.001	Quinclorac @ 0.375 lbs/A						
5	8	9		55.6	88.9	0.001	Quinclorac @ 0.18 lbs/A						
2	8	9		22.2	88.9	2.99	Sulfentrazone @ 0.03 lbs/A						
2	8	7		22.2	88.9	77.8	Sulfentrazone @ 0.02 lbs/A						
2	6	6		22.2	100.0	100.0	2,4-D IOE @ 0.70 lbs/A	Crab	Crabgrass	Dandelion	elion	Clover	ver
								Expected	Actual	Expected	Actual	Expected Actual	Actual
∞	6	6		88.9	100.0	100.0	0.75 Quinclorac + 0.03 Sulfentrazone	91.4	88.9	96.3	100.0	100.0	100.0
7	6	6		77.8	100.0	0.001	0.75 Quinclorac + 0.02 Sulfentrazone	91.4	77.8	96.3	100.0	100.0	100.0
7	6	6		77.8	100.0	100.0	0.375 Quinclorac + 0.03 Sulfentrazone	82.7	77.8	98.8	100.0	100.0	100.0
9	6	6		2.99	100.0	100.0	0.375 Quinclorac + 0.02 Sulfentrazone	82.7	66.7	98.8	100.0	100.0	100.0
9	6	6		1.99	100.0	100.0	0.18 Quinclorac + 0.03 Sulfentrazone	65.4	66.7	98.8	100.0	100.0	100.0
7	6	6		77.8	100.0	100.0	0.18 Quinclorac + 0.02 Sulfentrazone	65.4	77.8	98.8	100.0	100.0	100.0
8	6	6		88.9	100.0	0.001	0.75 Quinclorac + 0.03Sulfentrazone + 0.70 2,4-D IOE	93.3	88.9	100.0	100.0	100.0	100.0
8	6	6		88.9	100.0	100.0	0.75 Quinclorac + 0.02 Sulfentrazone + 0.70 2,4-D IOE	93.3	88.9	100.0	100.0	100.0	100.0
8	6	6		88.9	100.0	100.0	0.375 Quinclorac + 0.03 Sulfentrazone + 0.70 2,4-D IOE	86.6	88.9	100.0	100.0	100.0	100.0
7	6	6		77.8	100.0	100.0	0.375 Quinclorac + 0.02 Sulfentrazone + 0.70 2,4-D IOE	86.6	77.8	100.0	100.0	100.0	100.0

Test 3	Control (1-9) 24 HAT	-9) 24 HA	L	Ď	% Control 24 HAT	4 HAT		Treatment								
Crabgrass	Crabgrass Dandelion Clover	Clover	Plantain	Plantain Crabgrass Dandelion Clover Plantain	Dandelion	Clover	Plantain									
1	1	1	1	11.1	11.1	11.1	11.1	11.1 Quinclorac @ 0.75 lbs/A								
1	1	1	-	11.1	11.1	11.1	11.1	11.1 Quinclorac @ 0.375 lbs/A								
	1	1	1	11.11	11.1	11.1	11.1	11.1 Quinclorac @ 0.18 lbs/A								
1	3	2	4	11.1	33.3	22.2		44.4 Sulfentrazone @ 0.03 lbs/A								
1	3	3	4	11.1	33.3	33.3		44.4 Sulfentrazone @ 0.02 lbs/A								
1	3	4	4	11.1	33.3	44.4		44.4 MCPA IOE @ 1.10 lbs/A	Crabgrass	rass	Dandelion	lion	Clover	Į.	Plantain	in
									Expected Actual	Actual	Expected Actual		Expected /	Actual	Expected Actual Expected Actual	Actual
_	2	2	4	1.1	22.2	22.2		44.4 0.75 Quinclorac + 0.03 Sulfentrazone	21.0	11.1	40.7	22.2	30.9	22.2	50.6	44.4
-	2	2	4	Ξ	22.2	22.2		44.4 0.75 Quinclorac + 0.02 Sulfentrazone	21.0	11.1	40.7	22.2	40.7	22.2	50.6	44.4
-	2	2	4	1.11	22.2	22.2		44.4 0.375 Quinclorac + 0.03 Sulfentrazone	21.0	11.1	40.7	22.2	30.9	22.2	50.6	44.4
-	3	2	2	11.1	33.3	22.2		55.6 0.375 Quinclorac + 0.02 Sulfentrazone	21.0	11.1	40.7	33.3	40.7	22.2	50.6	55.6
-	3	3	5	11.1	33.3	33.3		55.6 0.18 Quinclorac + 0.03 Sulfentrazone	21.0	11.1	40.7	33.3	30.9	33.3	50.6	55.6
1	3	3	5	11.1	33.3	33.3		55.6 0.18 Quinclorac + 0.02 Sulfentrazone	21.0	11.1	40.7	33.3	40.7	33.3	50.6	55.6
1	3	4	5	11.1	33.3	44.4		0.75 Quinclorac + 0.03 Sulfentrazone + 55.6 1.10 MCPA IOE	29.8	11.1	60.5	33.3	9.19	44.4	72.6	55.6
1	3	3	4	11.1	33.3	33.3		0.75 Quinclorac + 0.02 Sulfentrazone + 44.4 1.10 MCPA IOE	29.8	11.1	60.5	33.3	67.1	33.3	72.6	44.4
?	3	4	4	1.11	33.3	44.4		0.375 Quinclorac + 0.03 Sulfentrazone + 44.4 1.10 MCPA 10E	29.8	11.1	60.5	33.3	61.6	44.4	72.6	44.4
-	3	4	4	11.1	33.3	44.4		0.375 Quinclorac + 0.02 Sulfentrazone + 44.4 1.10 MCPA IOE	29.8	11.1	60.5	33.3	67.1	44.4	72.6	44.4

r	_
_	┛

Test 3 Control (1-9) 72 HAT % Control 72 HAT Treatment Craberass Dandelion Clover Plantain Craberass Dandelion Clover Plantain								-	
22.2	22.2 22.2 Quinclorac @ 0.75 lbs/A	2 0.75 lbs/A							
22.2	22.2 Quinclorac @ 0.375 lbs/A	2) 0.375 lbs/A							
22.2	22.2 Quinclorac @ 0.18 lbs/A	2) 0.18 lbs/A							
33.3	66.7 Sulfentrazone @ 0.03 lbs/A	e @ 0.03 lbs/A							
22.2	88.9 Sulfentrazone @ 0.02 lbs/A	e @ 0.02 lbs/A							
44.4	44.4 MCPA IOE @ 1.10 lbs/A	@ 1.10 lbs/A	Crabgrass	SS	Dandelion	u	Clover		Plantain
-		E	Expected Actual		Expected	Actual	Expected Ac	Actual Expected	cted Actual
44.4	88.9 0.75 Quincle	88.9 0.75 Quinclorac + 0.03 Sulfentrazone	8.95	33.3	65.4	55.6	48.1	44.4	74.1 88.9
55.6	77.8 0.75 Quincle	77.8 0.75 Quinclorac + 0.02 Sulfentrazone	39.5	33.3	48.1	55.6	39.5	55.6	91.4
44.4	8.9 0.375 Quinc	88.9 0.375 Quinclorac + 0.03 Sulfentrazone	9.09	55.6	65.4	55.6	48.1	44.4	74.1 88.9
33.3	7.8 0.375 Quincl	77.8 0.375 Quinclorac + 0.02 Sulfentrazone	30.9	44.4	48.1	55.6	39.5	33.3	91.4
44.4	8.9 0.18 Quincle	88.9 0.18 Quinclorac + 0.03 Sulfentrazone	50.6	55.6	65.4	55.6	48.1	44.4	74.1 88.9
55.6	77.8 0.18 Quincle	77.8 0.18 Quinclorac + 0.02 Sulfentrazone	30.9	44.4	48.1	44.4	39.5	55.6	91.4 77.8
2.99	0.75 Quinclo 88.9 MCPA IOE	0.75 Quinclorac + 0.03 Sulfentrazone + 1.10 MCPA 10E	9.19	77.8	84.6	66.7	71.2	2.99	85.6 88.9
66.7	0.75 Quinclo 88.9 MCPA IOE	0.75 Quinclorac + 0.02 Sulfentrazone + 1.10 MCPA 10E	46.2	77.8	77.0	66.7	66.4	66.7	95.2 88.9
66.7	0.375 Quinclorac 88.9 1.10 MCPA 10E	0.375 Quinclorac + 0.03 Sulfentrazone + 1.10 MCPA IOE	56.1	77.8	84.6	66.7	71.2	66.7	85.6 88.9
66.7	0.375 Quinclorac 88.9 1.10 MCPA IOE	0.375 Quinclorac + 0.02 Sulfentrazone + 1.10 MCPA 10E	38.5	77.8	77.0	2.99	66.4	2.99	95.2 88.9

.

18	

% Co	<u>ق</u>	% Control 7 DAT	DAT	-	Treatment								
Crabgrass Dandelion Clover Plantain	Jandelion Clover Plantain	Clover Plantain	'lantain	ļ									
22.2 22.2 44.4 33.3 Quin	44.4		33.3 Quin	Quin	33.3 Quinclorac @ 0.75 lbs/A								
22.2 22.2 44.4 33.3 Quir	44.4		33.3 Quir) j	33.3 Quinclorac @ 0.375 lbs/A								
22.2 22.2 44.4 22.2 Quin	44.4		22.2 Quin	Qui	22.2 Quinclorac @ 0.18 lbs/A								
55.6 66.7 44.4 88.9 Sulf	44.4		88.9 Sulf	Sulf	88.9 Sulfentrazone @ 0.03 lbs/A								
44.4 33.3 100.0 Sulf	33.3		100.0 Sulf	Sulf	100.0 Sulfentrazone @ 0.02 lbs/A								
11.1 66.7 66.7 66.7 MCF	2.99		66.7 MCI	MC	66.7 MCPA IOE @ 1.10 lbs/A	Crabgrass	rass	Dandelion	lion	Clover	er	Plantain	nin
						Expected Actual		Expected Actual	_	Expected Actual		Expected Actual	Actual
66.7 66.7 44.4 100.0 0.75	44.4		100.0 0.75	0.75	100.0 0.75 Quinclorac + 0.03 Sulfentrazone	65.4	1.99	74.1	66.7	69.1	44.4	97.6	100.0
0.75	0 00 7 77	0 00		0.75	0.75 Quinclorac + 0.02 Sulfentrazone	0 75	9 22	0 73	6 77	0.63	777	0 001	000
77.8 44.4	4 4		100.0 0.37	0.37	100.0 0.375 Ouinclorac + 0.03 Sulfentrazone	56.0	77.8	74.1	77.8	69.1	44.4	92.6	100.0
77.8 44.4	44.4		88.9 0.375	0.375	88.9 0.375 Quinclorac + 0.02 Sulfentrazone	56.8	1.99	56.8	77.8	63.0	44.4	100.0	88.9
66.7 66.7 44.4 100.0 0.18	44.4		100.0 0.18	0.18	100.0 0.18 Quinclorac + 0.03 Sulfentrazone	65.4	2.99	74.1	1.99	69.1	44.4	91.4	100.0
66.7 66.7 44.4 88.9 0.18	44.4		88.9 0.18	0.18	88.9 0.18 Quinclorac + 0.02 Sulfentrazone	56.8	1.99	8.98	2.99	63.0	44.4	100.0	88.9
88.9 88.9 100.0 1.10	88.9 100.0	100.0	0.75 100.0 1.10	0.75	0.75 Quinclorac + 0.03 Sulfentrazone + 100.0 1.10 MCPA IOE	69.3	88.9	91.4	88.9	89.7	88.9	97.5	100.0
88.9 88.9 100.0 1.10 MCPA IOE	88.9 100.0	100.0	100.0 1.10	0.75	0.75 Quinclorac + 0.02 Sulfentrazone + 1.10 MCPA 10E	61.6	88.9	85.6	88.9	87.7	88.9	100.0	100.0
88.9 88.9 100.0 1.10 MCPA IOE	88.9 100.0	100.0	0.375 100.0	0.375	0.375 Quinclorac + 0.03 Sulfentrazone + 1.10 MCPA IOE	69.3	88.9	91.4	88.9	89.7	88.9	97.5	100.0
88.9 88.9 100.0 1.10 MCPA IOE	88.9 100.0	100.0	0.375 100.0 1.10 M	0.375 (1.10 N	0.375 Quinclorac + 0.02 Sulfentrazone + 1.10 MCPA IOE	9.19	6.88	85.6	6.88	87.7	6.88	100.0	100.0

L	7	۰
	_	

•	Test 3 Control (1-9) 14 DAT	-9) 14 D	AT	9,	% Control 14 DA	4 DAT		Treatment								
SS	Dandelion	Clover	Plantain	Crabgrass Dandelion Clover Plantain Crabgrass Dandelion	Dandelion	Clover	er Plantain									
	4	5	5	2.99	44.4	55.6	55.6	55.6 Quinclorac @ 0.75 lbs/A								
	4	5	4	44.4	44.4	55.6	44.4	44.4 Quinclorac @ 0.375 lbs/A								
	3	4	3	33.3	33.3	44.4	33.3	33.3 Quinclorac @ 0.18 lbs/A								
	7	5	8	55.6	77.8	55.6	88.9	88.9 Sulfentrazone @ 0.03 lbs/A								
	7	4	6	44.4	77.8	44.4	100.0	00.0 Sulfentrazone @ 0.02 lbs/A								
	7	8	7	22.2	77.8	88.9	77.8	77.8 MCPA IOE @ 1.10 lbs/A	Crabgrass	rass	Dandelion	lion	Clover	er	Plantain	ain
									Expected	Actual	Expected	Actual	Expected Actual		Expected Actual	Actual
	7	5	6	77.8	77.8	55.6	100.0	100.0 0.75 Quinclorac + 0.03 Sulfentrazone	85.2	77.8	87.7	77.8	80.2	55.6	95.1	100.0
	8	5	8	77.8	88.9	55.6	88.9	88.9 0.75 Quinclorac + 0.02 Sulfentrazone	81.5	77.8	87.7	88.9	75.3	55.6	100.0	88.9
	8	5	6	77.8	6.88	55.6	100.0	100.0 0.375 Quinclorac + 0.03 Sulfentrazone	75.3	77.8	87.7	88.9	80.2	55.6	93.8	100.0
	8	5	6	77.8	88.9	55.6	100.0	100.0 0.375 Quinclorac + 0.02 Sulfentrazone	69.1	77.8	87.7	88.9	75.3	55.6	100.0	100.0
	8	5	6	77.8	6'88	55.6	100.0	100.0 0.18 Quinclorac + 0.03 Sulfentrazone	70.4	77.8	85.2	88.9	75.3	55.6	97.6	100.0
	8	5	6	77.8	88.9	55.6	100.0	100.0 0.18 Quinclorac + 0.02 Sulfentrazone	63.0	77.8	85.2	88.9	1.69	55.6	100.0	100.0
	8	∞	6	88.9	88.9	88.9	100.0	0.75 Quinclorac + 0.03 Sulfentrazone + 100.0 1.10 MCPA IOE	88.5	88.9	97.3	88.9	97.8	6.88	98.9	100.0
	8	∞	6	88.9	88.9	88.9	100.0	0.75 Quinclorac + 0.02 Sulfentrazone + 100.0 1.10 MCPA IOE	85.6	88.9	97.3	88.9	97.3	6.88	100.0	100.0
	8	8	6	88.9	88.9	88.9	100.0	0.375 Quinclorac + 0.03 Sulfentrazone + 1.00.0 1.10 MCPA IOE	80.8	88.9	97.3	88.9	97.8	6.88	98.6	100.0
	8	8	9	88.9	88.9	88.9	100.0	0.375 Quinclorac + 0.02 Sulfentrazone + 100.0 1.10 MCPA IOE	76.0	88.9	97.3	88.9	97.3	6.88	100.0	100.0

-	-
c	- 3
•	~
•	` 1
•	٦

Test 3	Test 3 Control (1-9) 21 DAT	-9) 21 D,	AT	%	% Control 21 DAT	1 DAT		Treatment								
Crabgrass	Crabgrass Dandelion Clover Plantain	Clover	Plantain	Crabgrass Dandelion Clover Plan	andelion	Clover P.	lantain									
7	3	8	\$	77.8	33.3	6.88	55.6	55.6 Quinclorac @ 0.75 lbs/A								
9	5	8	4	66.7	55.6	6.88	44.4	44.4 Quinclorac @ 0.375 lbs/A								
3	3	9	3	33.3	33.3	66.7	33.3	33.3 Quinclorac @ 0.18 lbs/A								
4	7	5	6	44.4	77.8	55.6	100.0	100.0 Sulfentrazone @ 0.03 lbs/A								
3	9	4	6	33.3	66.7	44.4	100.0	100.0 Sulfentrazone @ 0.02 lbs/A								
4	8	6	7	44.4	88.9	100.0	77.8	77.8 MCPA IOE @ 1.10 lbs/A	Crabgrass	grass	Dandelion	elion	Clover	ver	Plantain	ain
									Expected Actual	Actual	Expected Actual	Actual	Expected Actual		Expected Actual	Actual
7	6	9	6	77.8	100.0	2.99	100.0	100.0 0.75 Quinclorac + 0.03 Sulfentrazone	87.7	77.8	85.2	100.0	95.1	66.7	100.0	100.0
7	6	5	6	77.8	100.0	55.6	100.0	0.75 Quinclorac + 0.02 Sulfentrazone	85.2	77.8	77.8	100.0	93.8	55.6	100.0	100.0
7	∞	7	6	77.8	6.88	77.8	100.0	100.0 0.375 Quinclorac + 0.03 Sulfentrazone	81.5	77.8	90.1	6.88	95.1	77.8	100.0	100.0
7	∞	9	6	77.8	6.88	2.99	100.0	100.0 0.375 Quinclorac + 0.02 Sulfentrazone	77.8	77.8	85.2	88.9	93.8	1.99	100.0	100.0
7	∞	7	6	77.8	6.88	77.8	100.0	100.0 0.18 Quinclorac + 0.03 Sulfentrazone	62.9	77.8	85.2	88.9	85.2	77.8	100.0	100.0
7	8	9	6	77.8	6.88	66.7	100.0	100.0 0.18 Quinclorac + 0.02 Sulfentrazone	55.6	77.8	77.8	88.9	81.5	66.7	100.0	100.0
8	6	6	6	88.9	100.0	100.0	100.0	0.75 Quinclorac + 0.03 Sulfentrazone + 100.0 1.10 MCPA IOE	93.1	88.9	98.4	100.0	100.0	100.0	100.0	100.0
8	∞	6	6	88.9	88.9	100.0	100.0	0.75 Quinclorac + 0.02 Sulfentrazone + 100.0 1.10 MCPA IOE	91.8	88.9	97.5	88.9	100.0	100.0	100.0	100.0
8	6	6	6	6.88	100.0	0.001	100.0	0.375 Quinclorac + 0.03 Sulfentrazone + 100.0 1.10 MCPA IOE	89.7	88.9	98.9	100.0	100.0	100.0	100.0	100.0
8	6	6	6	6.88	100.0	100.0	100.0	0.375 Quinclorac + 0.02 Sulfentrazone + 100.0 1.10 MCPA IOE	87.7	88.9	98.4	100.0	100.0	100.0	100.0	100.0

							Plantain	Expected Actual	40.7 44.4	40.7	40.7 55.6	40.7 44.4		40.7 44.4				
									44.4	33.3	33.3	33.3	_	33.3				
							Clover	Expected Actual	50.6	30.9	50.6	30.9	50 6]]		
							Dandelion	Actual	33.3	33.3	33.3	33.3	33.3		33.3			
							Dand	Expected Actual	40.7	30.9	48.1	39.5	40.7		30.9	30.9	30.9	30.9 60.5 53.9 65.4
							grass	Actual	11.1	11.1	11.1	11.1	. 11.1		11.1			
							Crabgrass	Expected Actual	21.0	21.0	21.0	21.0	21.0		21.0	21.0	29.8	29.8
Treatment		11.1 Quinclorac @ 0.75 lbs/A	11.1 Quinclorac @ 0.375 lbs/A	11.1 Quinclorac @ 0.18 lbs/A	33.3 Carfentrazone @ 0.02 lbs/A	33.3 Carfentrazone @ 0.01 lbs/A	22.2 MCPA IOE @ 1.10 lbs/A		0.75 Quinclorac + 0.02 44.4 Carfentrazone	0.75 Quinclorac + 0.01 44.4 Carfentrazone	0.375 Quinclorac + 0.02 55.6 Carfentrazone	0.375 Quinclorac + 0.01 44.4 Carfentrazone	0.18 Quinclorac + 0.02 44.4 Carfentrazone	0.18 Quinclorac + 0.01	55.6 Carfentrazone	55.6 Carfentrazone 0.75 Quinclorac + 0.02 44.4 Carfentrazone + 1.10 MCPA 10E	55.6 (Carfentrazone 0.75 Quinclorac + 0.02 44.4 Carfentrazone + 1.10 MCPA IOE 0.75 Quinclorac + 0.01 55.6 Carfentrazone + 1.10 MCPA IOE	55.6 Carfentrazone 0.75 Quinclorac + 0.02 44.4 Carfentrazone + 1.10 MCPA 10E 0.75 Quinclorac + 0.01 55.6 Carfentrazone + 1.10 MCPA 10E 0.375 Quinclorac + 0.02 55.6 Carfentrazone + 1.10 MCPA 10E
	ion Clover Plantain																	
rol 24 HAT	Clove	Ξ	11.1	Ξ	44.4	22.2	44.4		44.4	33.3	33.3	33.3	33.3	33.3		55.6		
% Control		11.1	22.2	11.1	33.3	22.2	33.3		33.3	33.3	33.3	33.3	33.3	33.3		33.3	33.3	44.4
	Crabgrass Dandelion Clover Plantain Crabgrass Dandel	11.1	11.1	11.1	11.1	11.1	1.11		11.11	11.1	11.1	11.1	11.1	11.1		11.1	11.11	1.11
IAT	r Plantain	-	-	-	3	3	2		4	4	5	4	4	5		4	4 2	4 8
1-9) 24 H	n Clover	-	-		4	2	4		4	<u>س</u>			3	3		2	5 5	8 8
Control (1-9) 24 HAT	Dandelio	-	2	-	3	2	3			3	3	3	3	3		,	7	4 4
Test 4	Crabgras	-	-	-		-	1		-		-	-	-	-			-	

Ţ		T						Actual	88.9	88.9	88.9	88.9	88.9	88.9	88.9	88.9	88.9	88.9
-							Plantain	Expected	77.8	97.6	74.1	91.4	74.1	91.4	87.7	95.9	85.6	95.2
								Actual	55.6	55.6	44.4	44.4	55.6	55.6	66.7	66.7	66.7	66.7
-							Clover	Expected /	56.8	56.8	56.8	56.8	56.8	56.8	80.8	80.8	80.8	80.8
							on	Actual	55.6	55.6	55.6	55.6	55.6	66.7	66.7	66.7	77.8	77.8
							Dandelion	Expected	65.4	48.1	65.4	48.1	65.4	48.1	84.6	77.0	84.6	77.0
- 							ass	Actual	33.3	33.3	55.6	33.3	55.6	44.4	66.7	55.6	66.7	55.6
							Crabgrass	Expected	56.8	39.5	50.6	30.9	50.6	30.9	61.6	46.2	56.1	38.5
22	Treatment	lantain	33.3 Quinclorac (a) 0.75 lbs/A	22.2 Quinclorae @ 0.573 los/A	66.7 Carfentrazone @ 0.02 lbs/A	88.9 Carfentrazone @ 0.01 lbs/A	44.4 MCPA IOE @ 1.10 lbs/A		88.9 0.75 Quinclorac + 0.02 Carfentrazone	88.9 0.75 Quinclorac + 0.01 Carfentrazone	88.9 0.375 Quinclorac + 0.02 Carfentrazone	88.9 0.375 Quinclorac + 0.01 Carfentrazone	88.9 0.18 Quinclorac + 0.02 Carfentrazone	88.9 0.18 Quinclorac + 0.01 Carfentrazone	0.75 Quinclorac + 0.02 Carfentrazone + 1.10 88.9 MCPA IOE	0.75 Quinclorac + 0.01 Carfentrazone + 1.10 88.9 MCPA IOE	0.375 Quinclorac + 0.02 Carfentrazone + 88.9 1.10 MCPA 10E	0.375 Quinclorac + 0.01 Carfentrazone + 88.9 1.10 MCPA 10E
	L.	-	22.2	2.77	44.4	44.4	55.6		55.6	55.6	44.4	44.4	55.6	55.6	299	66.7	66.7	66.7
	% Control 72 HAT	<u>ŏ</u>		22.7	_	33.3	55.6		55.6	55.6	55.6	55.6	55.6	2.99	1.99	66.7	77.8	77.8
	%	Crabgrass D	22.2		44.4	22.2	11.1		33.3	33.3	55.6	33.3	55.6	44.4	299	55.6	66.7	55.6
		Plantain	m (7 (9	∞	4		8	8	8	8	∞	∞	∞	8	8	8
	72 HAT	Clover	2	7 (1 4	4	5		\$	5	4	4	5	5	9	9	9	9
	Test 4 Control (1-9) 72 HAT	Crabgrass Dandelion Clover Plantain	2	2	5	3	5		5	5	5	5	5	6	9	9	7	7
	Test 4 C	Crabgrass	2	-	4	2	1		3	3	5	3	5	4	9	5	9	

Test	Test 4 Control(1-9) 7DAT	1-9) 710	AT		% Control 7 DAT	DAT		Treatment								
Crabgrass	Dandelion	Clover	Plantain	Crabgrass	Crabgrass Dandelion Clover Plantain Crabgrass Dandelion Clover		Plantain									
2	2	3	3	22.2	22.2	33.3	33.3	33.3 Quinclorac @ 0.75 lbs/A								
2	2	4	2	22.2	22.2	44.4	22.2	22.2 Quinclorac @ 0.375 lbs/A								
1	2	3	3	11.1	22.2	33.3	33.3	33.3 Quinclorac @ 0.18 lbs/A								
\$	∞	7	∞	55.6	6.88	77.8	88.9	88.9 Carfentrazone @ 0.02 lbs/A								
5	5	9	6	55.6	55.6	66.7	100.0	100.0 Carfentrazone @ 0.01 lbs/A								
1	4	9	9	11.1	44.4	2.99	66.7	66.7 MCPA IOE @ 1.10 lbs/A	Crabgrass	rass	Dandelion	lion	Clover	er	Plantain	ain
									Expected Actual		Expected Actual	Actual	Expected Actual		Expected Actual	Actual
9	&	9	6	1.99	88.9	66.7	100.0	100.0 0.75 Quinclorac + 0.02 Carfentrazone	65.4	66.7	91.4	88.9	85.2	66.7	92.6	100.0
9	∞	9	6	66.7	88.9	2.99	100.0	100.0 0.75 Quinclorac + 0.01 Carfentrazone	65.4	66.7	65.4	6.88	77.8	7.99	100.0	100.0
9	∞	9	6	66.7	88.9	1.99	100.0	100.0 0.375 Quinclorac + 0.02 Carfentrazone	65.5	1.99	91.4	88.9	87.7	66.7	91.4	100.0
5	7	9	8	55.6	77.8	2.99	88.9	88.9 0.375 Quinclorac + 0.01 Carfentrazone	65.4	55.6	65.4	77.8	81.5	66.7	100.0	88.9
9	8	9	6	66.7	6.88	2.99	100.0	100.0 0.18 Quinclorac + 0.02 Carfentrazone	60.5	1.99	91.4	88.9	85.2	66.7	97.6	100.0
9	8	9	8	1.99	88.9	2.99	88.9	88.9 0.18 Quinclorac + 0.01 Carfentrazone	60.5	66.7	65.4	6.88	77.8	66.7	100.0	88.9
8	8	6	6	88.9	6.88	100.0	100.0	0.75 Quinclorac + 0.02 Carfentrazone + 100.0 1.10 MCPA IOE	69.3	77.8	95.2	88.9	95.1	100.0	97.5	100.0
7	&	6	8	77.8	6.88	0.001	88.9	0.75 Quinclorac + 0.01 Carfentrazone + 88.9 1.10 MCPA 10E	69.3	77.8	80.8	88.9	92.6	100.0	100.0	88.9
7	6	6	6	77.8	100.0	100.0	100.0	0.375 Quinclorac + 0.02 Carfentrazone + 100.0 1.10 MCPA IOE	69.3	77.8	95.2	100.0	95.9	100.0	97.1	100.0
7	∞	6	6	77.8	88.9	100.0	100.0	0.375 Quinclorac + 0.01 Carfentrazone + 100.0 1.10 MCPA IOE	69.3	77.8	80.8	88.9	93.8	100.0	100.0	100.0

₹	+
	٠,
	N
-	

Test 4	Test 4 Control(1-9) 14 DAT	1-9) 141	JAT		% Control 14 DAT	4 DAT		Treatment								
Crabgrass	Dandelion	Clover	Plantain	Crabgrass Dandelion Clover Plantain Crabgrass Dandelion Clover	Dandelion		Plantain									
4	2	4	3	44.4	22.2	44.4		33.3 Quinclorac @ 0.75 lbs/A								
3	2	5	2	33.3	22.2	55.6		22.2 Quinclorac @ 0.375 lbs/A								
2	2	3	3	22.2	22.2	33.3	33.3	33.3 Quinclorac @ 0.18 lbs/A								
5	8	8	8	55.6	88.9	6.88		88.9 Carfentrazone @ 0.02 lbs/A								
5	5	9	6	55.6	55.6	2.99		100.0 Carfentrazone @ 0.01 lbs/A								
1	5	6	9	11.1	55.6	100.0		66.7 MCPA IOE @ 1.10 lbs/A	Crabgrass	rass	Dandelion	lion	Clover	er	Plantain	ıi.
									Expected Actual		Expected Actual		Expected Actual		Expected Actual	Actual
7	6	∞	6	77.8	100.0	88.9		100.0 0.75 Quinclorac + 0.02 Carfentrazone	75.3	77.8	91.4	100.0	93.8	88.9	97.6	100.0
∞	*	7	6	88.9	88.9	77.8		100.0 0.75 Quinclorac + 0.01 Carfentrazone	75.3	88.9	65.4	88.9	81.5	77.8	100.0	100.0
∞	8	7	6	88.9	6.88	77.8		100.0 0.375 Quinclorac + 0.02 Carfentrazone	70.4	88.9	91.4	88.9	95.1	77.8	91.4	100.0
7	∞	7	6	77.8	88.9	77.8		100.0 0.375 Quinclorac + 0.01 Carfentrazone	70.4	77.8	65.4	88.9	85.2	77.8	100.0	100.0
7	8	7	6	77.8	88.9	77.8		100.0 0.18 Quinclorac + 0.02 Carfentrazone	65.5	77.8	91.4	88.9	92.6	77.8	92.6	100.0
7	8	7	6	77.8	88.9	77.8		00.0 0.18 Quinclorac + 0.01 Carfentrazone	65.4	77.8	65.4	88.9	77.8	77.8	100.0	100.0
∞	6	6	6	88.9	100.0	100.0	100.0	0.75 Quinclorac + 0.02 Carfentrazone + 100.0 1.10 MCPA 10E	78.1	88.9	96.2	100.0	100.0	100.0	97.5	100.0
∞	6	6	6	6.88	100.0	100.0	100.0	0.75 Quinclorac + 0.01 Carfentrazone + 1.10 MCPA 10E	78.0	88.9	84.6	100.0	100.0	100.0	100.0	100.0
&	6	6	6	88.9	100.0	100.0	100.0	0.375 Quinclorac + 0.02 Carfentrazone + 100.0 1.10 MCPA 10E	73.7	88.9	96.2	100.0	100.0	100.0	97.1	100.0
∞	6	6	6	88.9	100.0	100.0	100.0	0.375 Quinclorac + 0.01 Carfentrazone + 100.0 1.10 MCPA IOE	73.7	88.9	84.6	100.0	100.0	100.0	100.0	100.0